

53769  
Work Order ID 68520

Thursday, April 14, 2011 1:09:11 PM



Page 1

Item ID: D350-748-101

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Installation, High Fwd

Start Date: 4/14/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 5/5/2011 Req'd Qty: 1.00



Customer:

Reference:

Approvals:

Process Plan:

*[Signature]*

Date: 11-04-14 Tooling:

Date:

QC:

Date: SPC (Y/N):

Date:

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D350-748-141	F								

100



DC

Document Control

DOCUMENT CONTROL

Memo

Photocopy bluefile & type labels per PPD 350-748-101 CHG002

**SCRAP**

*[Handwritten signature]*

*[Handwritten initials]*

110



CNC Bend 1

CNC Delta 100 Bender

BENDING MACHINE - CROSSTUBES

Memo

Bend tube as per Dwg D350-748-141 using CNC bender program D350F and Folio FT

*[Handwritten signature]*

11-8-3

120



QC

Quality Control

QC15- Crosstube Dimensional Check

Memo

0.00

0.00

# Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D30-748-101 PAR #: N/A Fault Category: Landing Gear Cross tube. NCR: Yes No DQA: A Date: 11.08.31  
 Resolution: Scrap Disposition: Scrap QA: N/C Closed: OK Date: 4/08/31

NCR: <u>68520</u>		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
<u>11/08/31</u>	<u>#10</u>	<u>tube is over bent + has</u> <u>A .0.438" kink.</u> <u>Tube is scrap.</u> <u>R.C. Process</u>	<u>CP</u> <u>11.08.23</u> <u>CP/042</u>	<u>Scrap tube as per</u> <u>Email from David Shepherd</u> <u>on Aug 31st to E. Downie</u> <u>see Attachment</u>	<u>TW</u> <u>11-08-30</u>	<u>2887.94</u> <u>11-08-30</u>	<u>CP</u> <u>11.08.23</u> <u>CP/042</u>	<u>J</u> <u>11/08/31</u>

NOTE: Date & initial all entries

[REDACTED]

Page 2

**Accept**

1. The first step in the process is to identify the problem. This involves gathering information about the situation and the people involved.

2. The second step is to analyze the problem. This involves breaking the problem down into smaller parts and understanding the causes.

3. The third step is to develop a plan. This involves deciding on the best way to solve the problem and setting goals.

4. The fourth step is to implement the plan. This involves putting the plan into action and making changes as needed.

5. The fifth step is to evaluate the results. This involves checking to see if the problem has been solved and if the goals have been met.

6. The sixth step is to reflect on the process. This involves thinking about what worked well and what could be improved.

7. The seventh step is to share the results. This involves telling others about what you have learned and how you solved the problem.

8. The eighth step is to continue to learn. This involves staying open to new ideas and ways of solving problems.

9. The ninth step is to be a good team player. This involves working well with others and helping them to solve their problems.

10. The tenth step is to be a good leader. This involves helping others to solve their problems and leading them to success.

**Setup Start**



**Stop**

[illegible]

1. The first step in the process is to identify the problem. This involves gathering information about the situation and understanding the needs of the stakeholders involved.

2. Once the problem is identified, the next step is to develop a plan. This involves setting goals, identifying resources, and determining the steps that need to be taken to address the problem.

3. The third step is to implement the plan. This involves putting the plan into action and monitoring progress to ensure that the goals are being met.

4. Finally, the fourth step is to evaluate the results. This involves assessing the effectiveness of the plan and making adjustments as needed to improve the outcome.

**Cust Item ID:**

**Customer:**

**Reference:**

Run Start

\_\_\_\_\_

**Approvals:**      **Process Plan:** \_\_\_\_\_ **Date:** \_\_\_\_\_ **Tooling:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Stop**

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

### Operation Description

### Set Up/ Run Hours

**Tool ID**

Tool #

Plan  
Code

**Accept Qty**

Reject  
QtyReject  
Number

**Insp.  
Stamp**

125

0.00

[illegible]

HandFXtube

## Memo

0.00

### Hand Finishing Crosstubes

\*\*\*Stress relief\*\*\*

Heat treat crosstube as per QSI010 4.3

Temp: \_\_\_\_\_

Start time: \_\_\_\_\_

Finish time:

127

QC6- Inspect dimensions to drawing

0.00

[illegible]

QC

## Memo

0.00

## Quality Control

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

**Work Order ID 68520**

Thursday, April 14, 2011 1:09:11 PM



Page 3

Item ID: D350-748-101

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Installation, High Fwd

Start Date: 4/14/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 5/5/2011 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

130

0.00



Crosstubes

Crosstubes

Memo

0.00

Crosstubes

1-Drill Tube as per Dwg D350-748-141 Using DT8876 A,B &C Drill Jigs,  
Set-up drill table as per QSI 010

2-Deburr

3-Engrave Part # and Batch # as per Dwg D350-748-141

4-Remove all marks from tube within limits of D350-748-141

5- Apply a light coat of LPS3 on the interior of tube  
Batch: \_\_\_\_\_

140

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

CHECK 10 DEG HOLES WITH DT8876E (EUROCOPTER CLAMP)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

Page 4



\_\_\_\_\_

**Abstract**

[illegible]**Cust Item ID:**[illegible]

**Customer:**

[illegible]

1. The first step is to identify the problem or question that needs to be answered. This involves understanding the context and the specific requirements of the task.

2. The second step is to gather relevant information and data. This can involve research, consultation with experts, or collecting data from various sources.

3. The third step is to analyze the information and data collected. This involves identifying patterns, trends, and relationships that can help in understanding the problem.

4. The fourth step is to develop a solution or answer. This involves applying the knowledge and skills gained from the previous steps to create a plan or strategy that addresses the problem.

5. The fifth step is to implement the solution. This involves putting the plan into action and monitoring the progress to ensure that the solution is effective.

6. The sixth step is to evaluate the results. This involves assessing the outcomes of the solution and determining whether they meet the requirements of the task.

7. The seventh step is to communicate the results. This involves sharing the findings and conclusions with the relevant stakeholders and providing feedback on the process.

8. The eighth step is to reflect on the process. This involves thinking about what worked well and what could be improved for future tasks.

9. The ninth step is to document the process. This involves creating a record of the steps taken and the results achieved, which can be used as a reference for future tasks.

10. The tenth step is to review the process. This involves looking back at the entire process and identifying any areas for improvement or further research.

Date:

**Insp.  
Stamp**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

0.00

Issue P/O: \_\_\_\_\_  
 Stress relief at 375° for 5 hours  
 Magnetic Particle Inspect per ASTM E1444  
 Cadum Plate per AMS-QQ-P-416B, Class 1, Type 2  
 Embrittle relief at 375° for 8 hours, Chromate Treat  
 Possible Supplier: Southwest United Industries  
 Ensure Certificate of Conformity is attached

0.00

1. The first step in the process is to identify the problem or issue that needs to be addressed. This involves gathering information and understanding the context of the problem.

2. Once the problem is identified, the next step is to define the objectives and goals of the project. This helps to clarify what needs to be achieved and provides a clear direction for the team.

3. The third step is to develop a plan or strategy to address the problem. This involves breaking down the problem into smaller, manageable tasks and determining the resources needed to complete each task.

4. The fourth step is to implement the plan. This involves putting the strategy into action and monitoring progress regularly to ensure that the project is on track.

5. The final step is to evaluate the results of the project. This involves assessing the outcomes against the objectives and goals and identifying any areas for improvement or further action.

0.00

Ensure certificate of conformity is attached

0.00

\_\_\_\_\_

0.00

## Quality Control

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



**Work Order ID 68520**

Thursday, April 14, 2011 1:09:11 PM



Page 5

Item ID: D350-748-101

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Installation, High Fwd

Start Date: 4/14/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 5/5/2011 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180 	SprayPaint	0.00							
SprayPaint	Memo	0.00							
Spray Painting	1-Prime inside crosstube as per QSI 005 4.2 2-Prime Outside of Tube as per Dart QSI 005 4.2								
190 	QC14- Inspect Spray Paint	0.00							
QC	Memo	0.00							
Quality Control	Then, Wrap in plastic bag to protect from scratches								
200 	Crosstubes	0.00							
Crosstubes	Memo	0.00							
Crosstubes	1-Install Ground wire Insert, then insert screw and washer 2-Install Abraison strips as per Dwg D350-748-141 & QSI 035. 3-Install supports Using Dt8876 as per Dwg D350-748-141, Torque to 60-80 IN-LBS								

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

**Work Order ID 68520**

Page 6

Thursday, April 14, 2011 1:09:11 PM

Item ID: D350-748-101

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Installation, High Fwd

Start Date: 4/14/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 5/5/2011 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Stop



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
210 	QC5- Inspect part completeness to step on W/O	0.00							
QC Quality Control	Memo	0.00							
220 	Pick Kit	0.00							
Packaging Packaging	Memo	0.00							
230 	QC4- 100% Inspect kits for completeness	0.00							
QC Quality Control	Memo	0.00							

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

**Work Order ID 68520**

Thursday, April 14, 2011 1:09:11 PM



Page 7

Item ID: D350-748-101

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Installation, High Fwd

Start Date: 4/14/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 5/5/2011 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Stop



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
240 	Packaging	0.00							
Packaging	Memo	0.00							
Packaging	Identify and pack for shipping as per PPP D350-748-101 Location: _____ PPP Rev: _____								
250 	QC21- Final Inspection - Work Order Release	0.00							
QC	Memo	0.00							
Quality Control									

MF  
11-08-31

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

Thursday, April 14, 2011 1:09:17 PM

**Parent Item:** D350-748-101




**Parent Item Name:** Crosstube Installation, High Fwd

**Start Date:** 4/14/2011**Required Date: 5/5/2011**

**Start Qty: 1.00**

**Required Qty: 1.00**

**Comments:** IPP Rev:A New Issue 06-07-05 JLM  
 IPP Rev:B Update qty of MS21042L5 06-09-12 KJ  
 IPP Rev:C Rev B 07-11-15 DD  
 IPP Rev D Combined manufacturing 08.04.02 EC verified by: DD  
 IPP Rev:E 08-06-24 revD as per dwg DD verified by:EC IPP Rev:F  
 10.08.04 added QSI010 4.3 DD verf:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D350-748-141TRN 		Manufactured	No	B68819		110	Each	1.0000	1	1	①	11-08-03	JS
Crosstube Turning Detail													
				<u>Location</u>				<u>Loc Qty</u>		<u>Loc Code</u>			
				LG046				1					
				64475				1					
ALS4-1032-225 		Purchased	No			200	Each	1,159.000	1	1			
Insert													
				<u>Location</u>				<u>Loc Qty</u>		<u>Loc Code</u>			
				FP-B				86					
				110768				86					
				ST282				1073					
				110768				1073					
AN960JD10 	NAS1149D0363J	Purchased	No			200	Each	0.0000	1	1			
Washer													

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



# Picklist Print

Thursday, April 14, 2011 1:09:17 PM

Work Order ID: 68520



Parent Item: D350-748-101



Parent Item Name: Crosstube Installation, High Fwd

Start Date: 4/14/2011

Required Date: 5/5/2011

Start Qty: 1.00

Required Qty: 1.00

D2856-400	Manufactured	No	200	f	231.0696	1.181	1.243158
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Abraison Strip

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
ST403	216	
68076	216	
ST409	15.0696	
63735	15.0696	

D3502-1	Manufactured	No	200	Each	31.0000	2	2
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Support

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
ST063	31	
61206	12	
61843	9	
64004	10	

MS21920-20	Purchased	No	200	Each	72.0000	2	2
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Clamp (per MIL-DTL-8783C)

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
LG050	72	
116799	22	
117279	50	

MS27039-1-10	Purchased	No	200	Each	80.0000	1	1
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Screw

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
ST291	80	
115935	80	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Picklist Print

Thursday, April 14, 2011 1:09:18 PM

Work Order ID: 68520



Parent Item: D350-748-101



Parent Item Name: Crosstube Installation, High Fwd

Start Date: 4/14/2011

Required Date: 5/5/2011

Start Qty: 1.00

Required Qty: 1.00

AN4-41A Purchased No 220 Each 198.0000 8 8



Bolt

Location

Loc Qty

Loc Code

ST360

198

115108

98

115705

50

116191

50

AN4-6A Purchased No 220 Each 1,071.000 16 16



Bolt

Location

Loc Qty

Loc Code

ST356

1071

115936

200

116191

71

116400

400

116924

400

AN5-32A Purchased No 220 Each 137.0000 4 4



Bolt

Location

Loc Qty

Loc Code

ST340

137

115108

27

115589

60

117161

50

AN960JD416 NAS1149D0463J Purchased No 220 Each 0.0000 32 32



Washer

AN960JD516 NAS1149D0563J Purchased No 220 Each 0.0000 8 8



Washer

Thursday, April 14, 2011 1:09:18 PM

Shop Packet Print

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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**NOTE:** Date & initial all entries

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Thursday, April 14, 2011 1:09:18 PM

Page 4

Work Order ID: 68520



Parent Item: D350-748-101



Parent Item Name: Crosstube Installation, High Fwd

Start Date: 4/14/2011

Required Date: 5/5/2011

Start Qty: 1.00

Required Qty: 1.00

D3500-1 Manufactured No 220 Each 35.0000 4 4



Saddle



Location Loc Qty Loc Code

ST424/25	20	
62207	20	
ST425	15	
61838	15	

D3501-1 Manufactured No 220 Each 67.0000 16 16



Bushing



Location Loc Qty Loc Code

ST063	67	
61984	67	

MS21042L4 Purchased No 220 Each 2,670.000 24 24



Nut



Location Loc Qty Loc Code

ST300	2670	
116188	670	
116823	2000	

MS21042L5 Purchased No 220 Each 765.0000 4 4



Nut



Location Loc Qty Loc Code

ST300	765	
115594	5	
116105	500	
116548	260	

Thursday, April 14, 2011 1:09:18 PM

Shop Packet Print

Page 4

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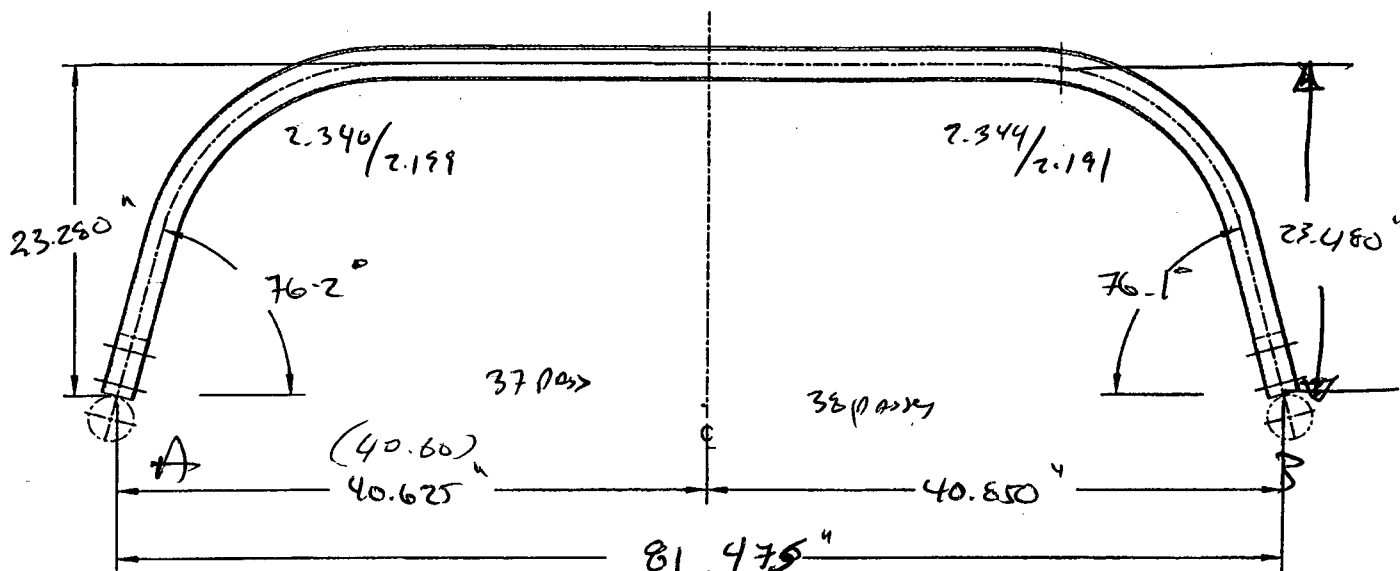
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**NOTE:** Date & initial all entries

DART AEROSPACE LTD		Work Order:	68520
Description: Crosstube High Fwd (AS350/355)		Part Number:	D350-748-101
Inspection Dwg: D350-748-141 Rev: E		Page 1 of 1	

Required Dimension	Min	Max
Height	23.13	23.37
1/2 Span	40.78	41.02
Angle	75	77
Total Span	81.56	82.04



Comments
twist 0.438
Side A = 3.1% crushing @ 37 Passes
Side B = 3.3% crushing @ 38 Passes

QC15 Inspection	
Date	

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	10.08.23	Dwg Rev updated	KJ	

1005-23

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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DATE	STEP	Description of NC Section A	Corrective Action <sup>2</sup> Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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**NOTE:** Date & initial all entries



Item	Qty -141	Part Number	Description
1	X	D350-748-141	CROSSTUBE ASSEMBLY (AS 350/355 HI FWD)
2	1	D6015-125	CROSSTUBE (OR D6017-115)
3	2	D3502-1	SUPPORT
4	2	D2856-400-710	ABRASION STRIP
5	1	AELS-1032-225	INSERT
6	1	NAS1149D0363J	WASHER (OR AN960JD10)
7	2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
8	1	MS27039-1-10	SCREW

#### GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6015-125 OR D6017-115  
FINISHED LENGTH = 110.270±0.06
- 2) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2  
Cadmium PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: DART PART NUMBER "D350-748-141" AND BATCH NUMBER ON INSIDE OF CUFF  
PER DART QSI 044 6.4 (VIBRATING STYLUS)
- 7) WEIGHT: 30.45 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.297 HOLE.
- 9) BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.  
NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING. ACCEPTABLE TO VERIFY TENSILE STRENGTH BY HARDNESS TEST PER ASTM E18 TO 40-45 HRC.
- 12) INSTALL D2856-400-710 ABRASION STRIPS WITH A GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 13) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- 14) TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.
- 15) MAX TWIST AFTER BENDING: WITH XTUBE LAYED FLAT ON SURFACE, THE DIFFERENCE BETWEEN CUFF HEIGHTS FROM THE SURFACE MAY BE NO LARGER THAN 0.25 (ZN C1-3).

SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO. 48520  
R/11-04-14

RELEASED  
2011-01-18

F	ADD HRC TEST OPTION (B8-1) PER PAR 09-040, ADD TWIST LIMIT (A8-1, C1-3), ADD D6015-125 OPTION (C8-1), STOCK DIM NOW MACHINED (D1-4)	CP	10.11.23
E	REVISE GENERAL NOTES; UPDATE TO CURRENT ADD STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A8-3); TOLERANCES (ZN C8-3, D1-3)	RF	09.09.30
D	MAG. PARTICLE AND CAD PLATE AS MFD.	CP	06.10.31
C	ADD CAD PLATING	CP	06.08.14
B	ADD D6017-115 & PRIME AND PAINT	CP	06.06.30
A	NEW ISSUE	CP	06.03.31
REV.	DESCRIPTION	BY	DATE
DESIGN	<u>97</u>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	<u>97</u>		
CHECKED	<u>97</u>	DRAWING NO.	REV. F
MFG. APPR.	<u>97</u>	D350-748-141	SHEET 1 OF 4
APPROVED	<u>97</u>	TITLE	SCALE
DE APPR.	<u>97</u>	CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	10.11.23	COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSES OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

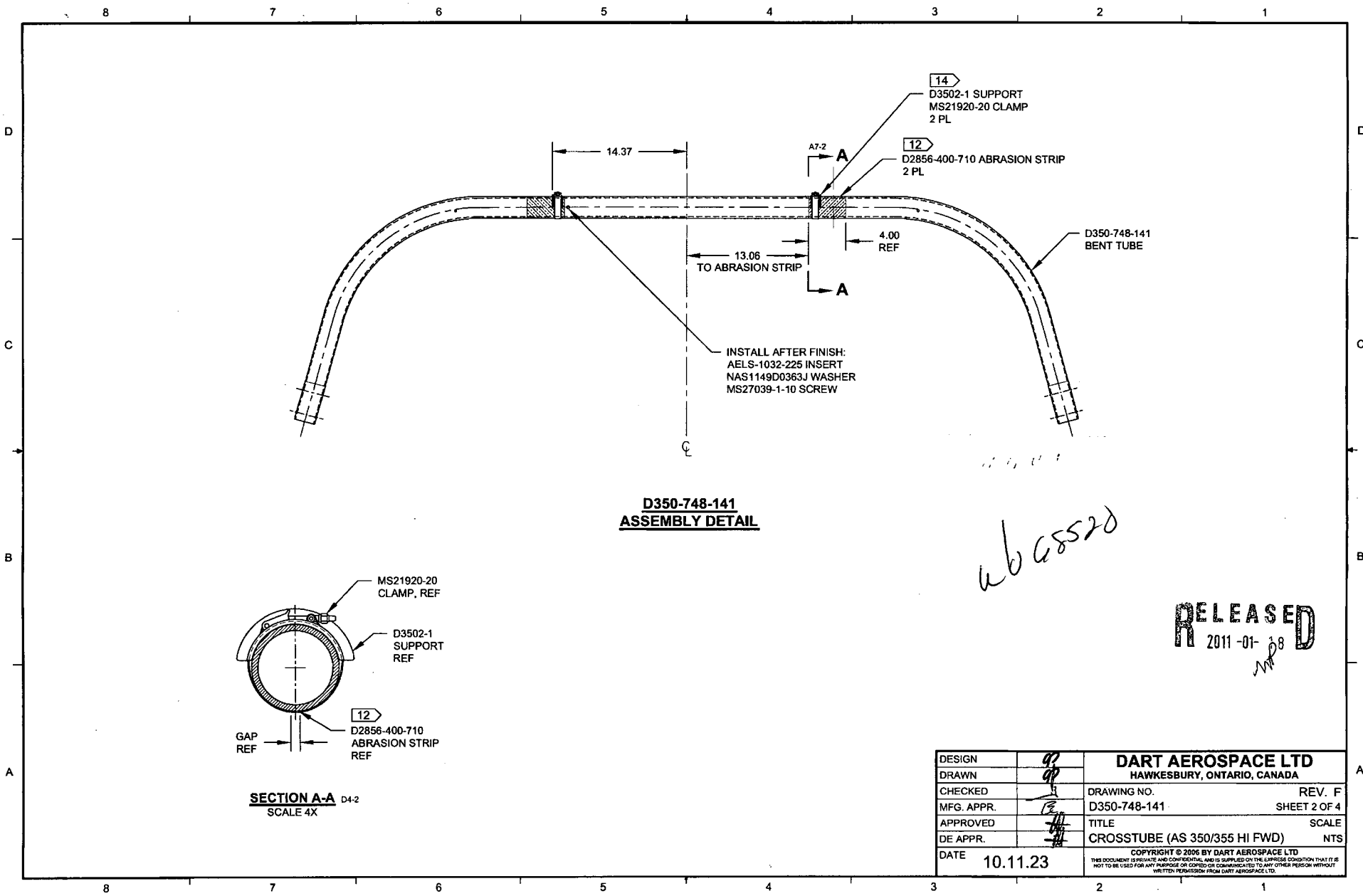
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**NOTE:** Date & initial all entries



**RELEASED**  
2011-01-38

DESIGN		<b>DART AEROSPACE LTD</b>	
DRAWN	<i>JP</i>	HAWKESBURY, ONTARIO, CANADA	
CHECKED	<i>JP</i>	DRAWING NO.	REV. F
MFG. APPR.	<i>JP</i>	D350-748-141	SHEET 2 OF 4
APPROVED	<i>JP</i>	TITLE	SCALE
DE APPR.	<i>JP</i>	CROSSTUBE (AS 350/355 HI FWD)	NTS
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W/O:		WORK ORDER CHANGES					
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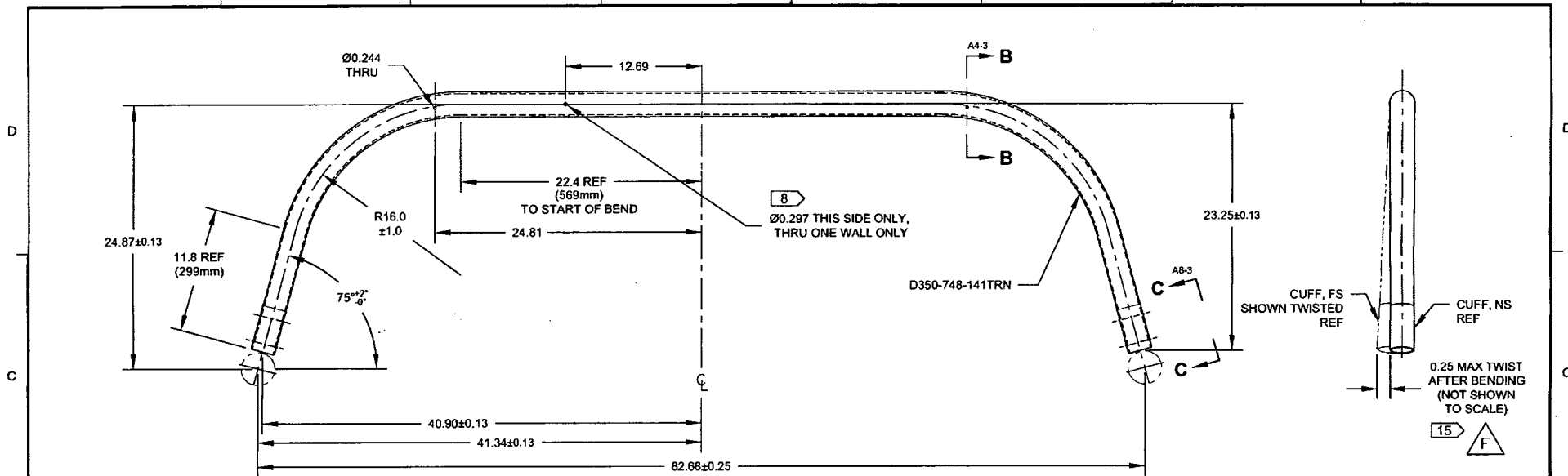
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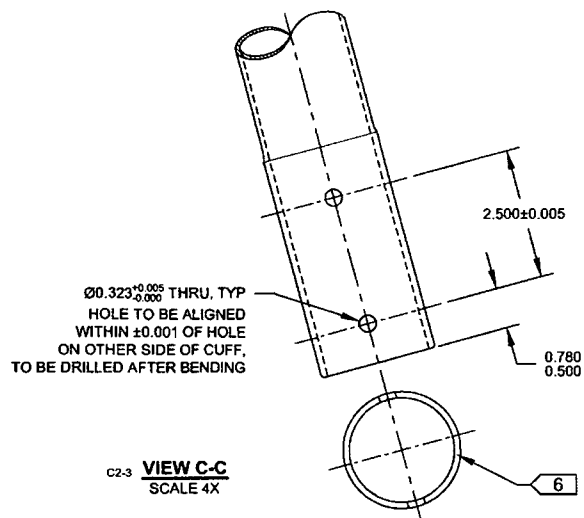
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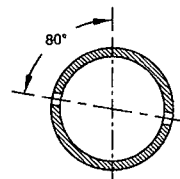
**D350-748-141**  
**BENDING AND DRILLING DETAIL** 10

*Wb 65520*

RELEASED  
2011-01-18  
MD



**VIEW C-C**  
**SCALE 4X**



**SECTION B-B** D3-3  
**SCALE 4X**

DESIGN	97	<b>DART AEROSPACE LTD</b>	
DRAWN	97	HAWKESBURY, ONTARIO, CANADA	
CHECKED	16	DRAWING NO.	REV. F
MFG. APPR.	16	D350-748-141	SHEET 3 OF 4
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DE APPR.	16	CROSSTUBE (AS 350/355 HI FWD)	NTS
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8 7 6 5 4 3 2 1

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



## Eric Downing

---

**From:** David Shepherd <dshepherd@dartaero.com>  
**Sent:** August 3, 2011 4:36 PM  
**To:** 'Eric Downing'  
**Cc:** 'Bill Beckett'; 'Mike Petsche'; 'L Lacelle'; 'Susanne Sheldon (Susanne Sheldon)'; 'Chris Provencal'  
**Subject:** RE: 350 cross tubes out of tol.

Eric,

Not sure what to tell you ... I think this is a scrap tube ... It is already 0.33" narrower than nominal ... If we trim it to make it level, it will be close to 0.50" narrower than nominal ... Compounded with the fact that is twisted by almost 0.50" ... With everything that is wrong with this tube, I don't think Chris would accept it either ... It's going to be tough for a customer to get everything to line up and he will have to pre-stress the gear quite a bit to get it together. Please scrap the tube, or set it aside for development testing.

Thanks,  
David

---

**From:** Eric Downing [mailto:edowning@dartaero.com]  
**Sent:** August-03-11 2:10 PM  
**To:** 'David Shepherd'  
**Cc:** 'Bill Beckett'; 'Mike Petsche'; 'L Lacelle'; 'Susanne Sheldon (Susanne Sheldon)'  
**Subject:** RE: 350 cross tubes out of tol.

David

Sorry about that David I didn't see it was missing a batch #. The # is 72502. I re attached the dim sheet with the correct Batch # on it.

For tube B68520 could we cut it to the correct height and span and from talking to Dan Paquette he has told me that Chris has approved that high of a twist before. I'll look tomorrow to make sure we have in the past. But I know that we are up against the wall( as Bill would say) to try to get as many tubes as possible sent out for Cad plating so if it could be saved it would be much appreciated. But if it can't it can't then it should be scrapped.

Downing

---

**From:** David Shepherd [mailto:dshepherd@dartaero.com]  
**Sent:** August 3, 2011 3:58 PM  
**To:** 'Eric Downing'  
**Cc:** 'Bill Beckett'; Mike Petsche; 'L Lacelle'; 'Susanne Sheldon (Susanne Sheldon)'  
**Subject:** FW: 350 cross tubes out of tol.

Eric,

B68519 is acceptable  
B????? is acceptable (please add a B/N to inspection sheet)

B68520 is badly twisted and has height/spread difference from side-to-side of 0.25" so I think it should be scrapped.

David

---

**From:** Eric Downing [mailto:[edowning@dartaero.com](mailto:edowning@dartaero.com)]

**Sent:** August-03-11 1:37 PM

**To:** 'David Shepherd'; 'Mike Petsche'

**Cc:** Bill Beckett; Linda Lacelle; Susanne Sheldon

**Subject:** 350 cross tubes out of tol.

Hey David

I have Qty 3 cross tubes that are out of tolerance and need to be approved by you. I have scanned the dim sheets and attached them to the email. I need an answer ASAP to be able to put them in the oven to get the stress relief done.

Thanks

**Eric Downing**

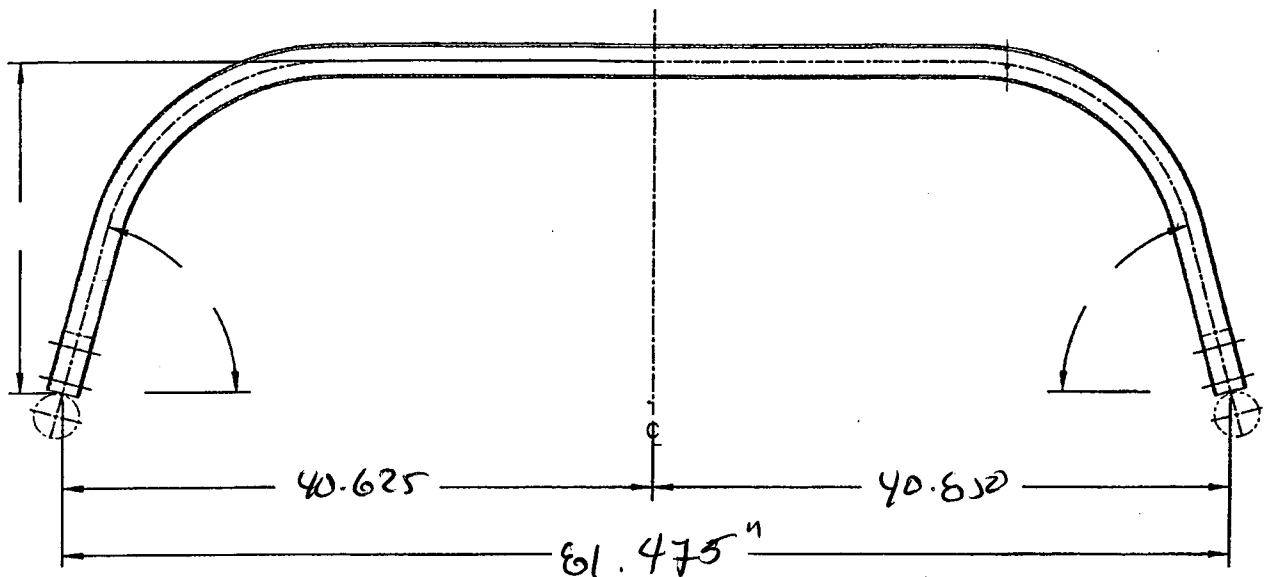
**QC COORDINATOR**

**DART AEROSPACE**

**[EDOWNING@DARTAERO.COM](mailto:EDOWNING@DARTAERO.COM)**

DART AEROSPACE LTD		Work Order:	
Description: Crosstube High Fwd (AS350/355)		Part Number:	D350-748-101
Inspection Dwg: D350-748-141      Rev: E		Page 1 of 1	

Required Dimension	Min	Max
Height	23.13	23.37
1/2 Span	40.78	41.02
Angle	75	77
Total Span	81.56	82.04



Comments
twist = 0.465

QC15 Inspection	
Date	

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	10.08.23	Dwg Rev updated	KJ	

11/08/23

